

Borehole

21-00-01**Log Event A****Borehole Information**

Farm : <u>BX</u>	Tank : <u>BX</u>	Site Number : <u>299-E33-63</u>
N-Coord : <u>45,670</u>	W-Coord : <u>53,312</u>	TOC Elevation : <u>655.74</u>
Water Level, ft :	Date Drilled : <u>11/30/1947</u>	

Casing Record

Type : <u>Steel-welded</u>	Thickness, in. : <u>0.320</u>	ID, in. : <u>8</u>
Top Depth, ft. : <u>0</u>	Bottom Depth, ft. : <u>150</u>	

Borehole Notes:

Borehole 21-00-01 was drilled in November 1947 to a depth of 150 ft with 8-in. casing. The casing thickness was measured at 0.320 in. Data from the drilling log and Chamness and Merz (1993) were used to provide construction information. The drilling log reports that the borehole casing was perforated from 40 to 100 ft, but does not indicate if the borehole was grouted. The top of the casing, which is the zero reference for the SGLS, is about 0.5 ft below the ground surface.

The current total depth of the borehole was measured at 143.8 ft below the top of the casing using a weighted tape, although, this borehole was drilled to a total depth of 150 ft in 1947. The total depths from the historical gross gamma log runs have become progressively shallower over time, indicating that the casing perforations have allowed loose sand to infiltrate into and slowly fill the borehole, or sand and silt has entered the borehole from the ground surface.

Equipment Information

Logging System : <u>1B</u>	Detector Type : <u>HPGe</u>	Detector Efficiency: <u>35.0 %</u>
Calibration Date : <u>02/1997</u>	Calibration Reference : <u>GJO-HAN-13</u>	Logging Procedure : <u>P-GJPO-1783</u>

Log Run Information

Log Run Number : <u>1</u>	Log Run Date : <u>07/03/1997</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>143.5</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>90.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>

Log Run Number : <u>2</u>	Log Run Date : <u>07/16/1997</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>91.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>22.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>

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21-00-01**Log Event A**

Log Run Number :	<u>3</u>	Log Run Date :	<u>07/17/1997</u>	Logging Engineer:	<u>Alan Pearson</u>
Start Depth, ft.:	<u>0.0</u>	Counting Time, sec.:	<u>100</u>	L/R : <u>L</u>	Shield : <u>N</u>
Finish Depth, ft. :	<u>23.0</u>	MSA Interval, ft. :	<u>0.5</u>	Log Speed, ft/min.:	<u>n/a</u>

Analysis Information

Analyst : E. LarsenData Processing Reference : MAC-VZCP 1.7.9Analysis Date : 12/03/1997

Analysis Notes :

This borehole was logged by the SGLS in three log runs. The pre-survey and post-survey field verification spectra for all logging runs met the acceptance criteria established for peak shape and system efficiency. The energy calibration and peak-shape calibration from these spectra were used to establish the peak resolution and channel-to-energy parameters used in processing the spectra acquired during the logging operation.

Casing correction factors for a 0.320-in.-thick steel casing were applied during analysis.

The man-made radionuclide Cs-137 was detected in this borehole. The Cs-137 contamination was detected continuously from the ground surface to 7 ft. Isolated occurrences of Cs-137 were detected at 17, 66, 67.5, 129.5, and 134.5 ft and at the bottom of the logged interval (143.5 ft). Zones of continuous and intermittent Cs-137 contamination were detected between 91.5 and 118.5 ft.

An analysis of the shape factors associated with applicable segments of the spectra was performed. The shape factors provide insights into the distribution of the Cs-137 contamination and into the nature of zones of elevated total count gamma-ray activity not attributable to gamma-emitting radionuclides.

The K-40 concentration values increase from 33.5 to 36 ft and remain elevated to the bottom of the logged interval. A relatively large peak in the U-238 concentration values occurs at about 125 ft.

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Report for tank BX-106.

Log Plot Notes:

Separate log plots show the man-made and the naturally occurring radionuclides. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations. Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.



Spectral Gamma-Ray Borehole Log Data Report

Page 3 of 3

Borehole

21-00-01

Log Event A

Plots of the spectrum shape factors are included. The plots are used as an interpretive tool to help determine the radial distribution of man-made contaminants around the borehole.